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Introduction to Flow of Energy in Ecosystems

Ecologists are scientists who study ecosystems. Ecosystems are communities of living things, like plants and animals, and non-living things, like rocks and soil. Living and non-living things share an environment and resources within that environment.

One part of an ecologist's job is learning about what happens when an ecosystem is threatened or disrupted. Today, you will learn about ecosystems and what happens when they are disrupted.

Step 1: Read information about how energy flows in ecosystems

Read the information below. Then, answer the questions.

Ecosystems rely on energy. Energy comes from food and other materials that help living things perform the processes of life. Energy is important in an ecosystem because it provides organisms with the ability to grow, move, and reproduce.

Did you know that energy flows through an ecosystem? All energy in an ecosystem started with energy from the sun. The sun provides energy to living things. Energy flows through different levels of the ecosystem.



- The first level of an ecosystem is producers. Producers are organisms that use energy from the sun. They use some of the energy to live and grow and they store the rest of the energy. Trees and grass are examples of producers.



- The next level is primary consumers. Primary consumers cannot use energy from the Sun. Instead, they get energy from producers. This means when they eat plants, they are getting the stored energy in the plant. Primary consumers use some of the energy to live and grow, and they store the rest of the energy. For example, rabbits and deer are primary consumers because they eat grass.



- The next level is secondary consumers. Secondary consumers eat primary consumers and get their stored energy. Secondary consumers use some of the energy to live and grow, and they store the rest. For example, snakes are secondary consumers because they eat rabbits.



- The next level is tertiary consumers. Tertiary consumers eat secondary consumers to get their energy. For example, owls are tertiary consumers because they eat snakes.

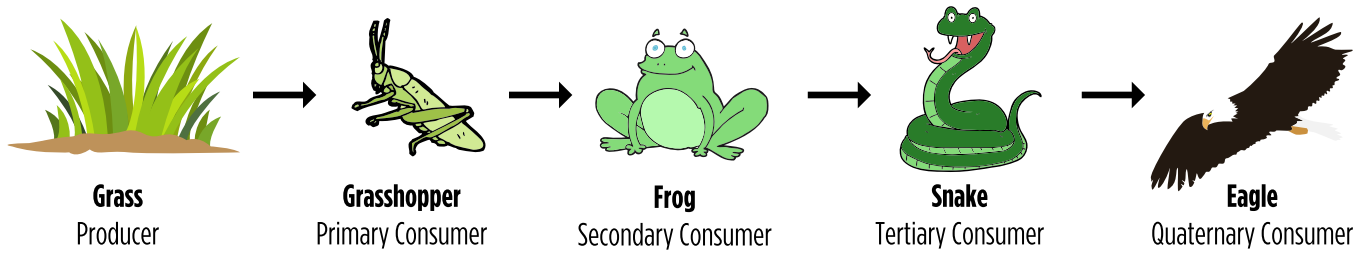


- All plants and animals die. That's where another part of the food chain called decomposers comes in. Decomposers eat things like dead plants, dead animals and poop to get their energy. For example, fungi are decomposers because they eat decaying plants. Dung beetles are also decomposers because they eat animal feces. Decomposers eat things from all levels of the food chain and turn the things they eat into soil that helps plants grow.

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Scientists use a diagram called a food chain to show the flow of energy in an ecosystem. Here is an example of a food chain:



Answer the questions below about the flow of energy in an ecosystem and food chains.

1. Where does all energy in an ecosystem originally come from?
2. What happens to secondary and tertiary consumers if there aren't any primary consumers to eat?
3. In the example above, why is the grasshopper the primary consumer in the food chain?
4. Why are eagles quaternary consumers and not secondary or primary consumers?
5. Give an example of a decomposer that could exist in the food chain above.

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Step 2: Read information about threats to ecosystem

Read the information below. Then, answer the questions.

Ecosystems face threats to the flow of energy. When this happens, an entire ecosystem can be altered. Ecosystems can be disrupted by natural events, like a tornado. For example, a tornado might knock down trees and destroy animals' habitats. When habitats are destroyed, animals die. As a result, other animals may also die because they don't have a food source. Human activity can also disrupt ecosystems. For example, when humans cut down trees they also destroy animal habitats.

Here is an example of how a threat can disrupt an entire ecosystem!

Threat to Ecosystem:

Use of pesticides on farms

How Ecosystem is Altered:

- Pesticide coats the plants on the farm.
- Frogs, which are primary consumers, eat plants. Many frogs die because the pesticide is poisonous to them.
- Snakes, which are secondary consumers, get sick when they eat frogs that have pesticide inside them. Snakes might also die because they don't have frogs to eat.
- Eagles, which are tertiary consumers, get sick when they eat snakes that have pesticide inside them or die because they don't have snakes to eat.

Answer the questions below about threats to an ecosystem.

1. In the example above, a natural event like a tornado effected an ecosystem. Give another example of a way that a natural event can threaten an ecosystem.

2. In the example above, the human use of pesticides can alter an ecosystem. Give another example of a way that humans can threaten an ecosystem.

3. In the example above, eagles and snakes were affected by something that happened lower in the ecosystem. Give another example of how a lower level of this ecosystem could affect a higher level.

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Step 3: Make a food chain

Use the information below to create a food chain. Your food chain must include the following requirements:

- At least one producer, one primary consumer, one secondary consumer, and one tertiary consumer.
- Labels and pictures of each producer and consumer.
- Arrows to show the flow of energy in the food chain.

Desert Organism Information

Organism	Picture of Organism	What the organism uses for energy
Rattlesnake		Tarantula, Rabbit, Lizard
Hawk		Rabbit, Lizard, Kangaroo Rat
Tarantula		Kangaroo Rat
Kangaroo Rat		Star Cactus
Rabbit		Grass, Star Cactus
Lizard		Grasshopper

Organism	Picture of Organism	What the organism uses for energy
Grasshopper		Grass, Star Cactus, Cactus
Grass		Photosynthesis (energy from the sun)
Star Cactus		Photosynthesis (energy from the sun)
Cactus		Photosynthesis (energy from the sun)
Bacteria		Decomposes dead organisms

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Use the space below to draw your food chain. Be sure to include all of the requirements.